



Application No. 09/423,545
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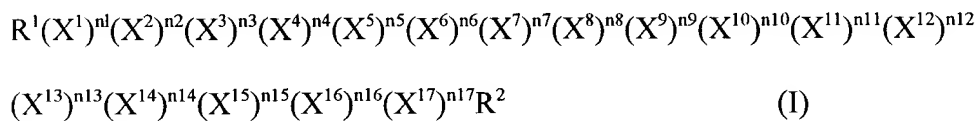
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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

1. (Amended) A cyclic peptide, or a pharmaceutically acceptable salt thereof, having [a cyclic structure and having] an activity to restore [the] DNA-binding activity or [the] P53 protein-dependent transcription activity to mutant P53 protein, [or a pharmaceutically acceptable salt thereof,] said peptide being represented by [general] formula (I):



[{]wherein

any of X^1 to X^{17} may be denoted by X^i , [and $n1$ to $n17$ may be denoted by X^i and n_i , respectively (i [stands for] being an integer of 1 to 17)]; X^i represents an amino acid residue or an organic acid residue as defined below];

any of $n1$ to $n17$ may be denoted by n_i , where n_i represents 0 or 1[;]
such that $(X^i)^{n_i}$ represents X^i when n_i is 1[,] and represents a bond when n_i is 0;

n_i represents 1 for at least 7 [to 17] different X^i 's [($n_i=1$) are selected, arranged in order of increasing number i , and bonded to one another], with R^1 bonded to the N-terminus and R^2 bonded to the C-terminus[,] to represent one sequence, in which a functional group in residue X^p (where p is an integer of 1 to 11) [is selected from the group of X^1 to X^{11}] and a functional group in residue X^q (where q is an integer of 8 to 17,

provided that q is larger than p) [is selected from the group of X^8 to X^{17}] together form a cyclic structure;

R^1 represents substituted or unsubstituted alkanoyl, substituted or unsubstituted alkoxycarbonyl, substituted or unsubstituted aralkyloxycarbonyl, substituted or unsubstituted aryloxycarbonyl, substituted or unsubstituted aroyl, 9-fluorenylmethoxycarbonyl[,] or hydrogen;

X^1 represents a residue of 2-mercaptopbenzoic acid, 3-mercaptopropionic acid, 4-mercaptopbutanoic acid, mercaptoacetic acid, adipic acid, suberic acid, cysteine, homocysteine, penicillamine, aspartic acid, glutamic acid, homoglutamic acid, isoaspartic acid, isoglutamic acid, 2-aminoadipic acid, 2-aminosuberic acid, ornithine, lysine, 2,4-diaminobutanoic acid, 2,3-diaminopropionic acid, p-aminophenylalanine, serine, threonine, homoserine, α -methylserine, 3-hydroxyproline or 4-hydroxyproline;

X^2 represents a residue of leucine, isoleucine, valine, alanine, norvaline, norleucine, 2-aminobutanoic acid, homoleucine, β -alanine, α -aminoisobutanoic acid, β -cyclopropylalanine, β -chloroalanine, 1-aminocyclopentane-1-carboxylic acid, 1-amino-1-cyclohexanecarboxylic acid, 2-amino-1-cyclopentanecarboxylic acid, t-butylglycine, diethylglycine, t-butylalanine, O-methylserine, cyclohexylglycine, cyclohexylalanine or glycine;

X^3 represents a residue of lysine arginine, ornithine, 2,4-diaminobutanoic acid, 2,3-diaminopropionic acid, p-aminophenylalanine or glycine;

X⁴ represents a residue of serine, threonine, homoserine, α -methylserine, 3-hydroxyproline, 4-hydroxyproline, cysteine, homocysteine, penicillamine, aspartic acid, glutamic acid, homoglutamic acid, isoaspartic acid, isoglutamic acid, 2-aminoadipic acid, 2-aminosuberic acid, ornithine, lysine, 2,4-diaminobutanoic acid, 2,3-diaminopropionic acid, p-aminophenylalanine, glycine, 2-mercaptobenzoic acid, 3-mercaptopropionic acid, 4-mercaptoputanoic acid, mercaptoacetic acid, adipic acid or suberic acid;

X⁵ represents a residue of lysine, arginine, ornithine, 2,4-diaminobutanoic acid, 2,3-diaminopropionic acid, p-aminophenylalanine or glycine;

X⁶ represents a residue of lysine, arginine, ornithine, 2,4-diaminobutanoic acid, 2,3-diaminopropionic acid, p-aminophenylalanine or glycine;

X⁷ represents a residue of alanine, β -alanine, 2-aminobenzoic acid, 3-aminobenzoic acid, 4-aminobenzoic acid, 3-aminomethylbenzoic acid, proline, 3-hydroxyproline, 4-hydroxyproline, L-1,2,3,4-tetrahydroisoquinoline-7-carboxylic acid, cysteine, homocysteine, penicillamine, 2,3-diaminopropionic acid, 2,4-diaminobutanoic acid, ornithine, lysine, p-aminophenylalanine, aspartic acid, glutamic acid, isoaspartic acid, isoglutamic acid, 2-aminoadipic acid, 2-aminosuberic acid or glycine;

X⁸ represents a residue of glutamine, asparagine, cysteine, homocysteine, penicillamine, aspartic acid, glutamic acid, homoglutamic acid, isoaspartic acid, isoglutamic acid, 2-aminoadipic acid, 2-aminosuberic acid, ornithine, lysine, 2,4-diaminobutanoic acid, 2,3-diaminopropionic acid, p-aminophenylalanine, serine, threonine,

homoserine, α -methylserine, 3-hydroxyproline, 4-hydroxyproline, glycine, 2-mercaptobenzoic acid, 3-mercaptopropionic acid, 4-mercaptobutanoic acid, mercaptoacetic acid, adipic acid or suberic acid;

X⁹ represents a residue of serine, threonine, homoserine, α -methylserine, 3-hydroxyproline, 4-hydroxyproline, cysteine, homocysteine, penicillamine, aspartic acid, glutamic acid, homoglutamic acid, isoaspartic acid, isoglutamic acid, 2-aminoadipic acid, 2-aminosuberic acid, ornithine, lysine, 2,4-diaminobutanoic acid, 2,3-diaminopropionic acid, p-aminophenylalanine, glycine, 2-mercaptobenzoic acid, 3-mercaptopropionic acid, 4-mercaptobutanoic acid, mercaptoacetic acid, adipic acid or suberic acid;

X¹⁰ represents a residue of serine, threonine, homoserine, α -methylserine, hydroxyproline, cysteine, homocysteine, penicillamine, aspartic acid, glutamic acid, homoglutamic acid, isoaspartic acid, isoglutamic acid, 2-aminoadipic acid, 2-aminosuberic acid, ornithine, lysine, 2,4-diaminobutanoic acid, 2,3-diaminopropionic acid, p-aminophenylalanine, glycine, 2-mercaptobenzoic acid, 3-mercaptopropionic acid, 4-mercaptobutanoic acid, mercaptoacetic acid, adipic acid or suberic acid;

X¹¹ represents a residue of serine, threonine, homoserine, α -methylserine, hydroxyproline, cysteine, homocysteine, penicillamine, aspartic acid, glutamic acid, homoglutamic acid, isoaspartic acid, isoglutamic acid, 2-aminoadipic acid, 2-aminosuberic acid, ornithine, lysine, 2,4-diaminobutanoic acid, 2,3-diaminopropionic

acid, p-aminophenylalanine, glycine, 2-mercaptobenzoic acid, 3-mercaptopropionic acid, 4-mercaptoputanoic acid, mercaptoacetic acid, adipic acid or suberic acid;

X¹² represents a residue of lysine, arginine, ornithine, 2,4-diaminobutanoic acid, 2,3-diaminopropionic acid, p-aminophenylalanine or glycine;

X¹³ represents a residue of histidine, alanine, 4-thiazolylalanine, 2-thienylalanine, 2-pyridylalanine, 3-pyridylalanine, 4-pyridylalanine, (3-N-methyl)piperidylalanine, 3-(2-quinoyl)alanine, serine, threonine, homoserine, α -methylserine, 3-hydroxyproline, 4-hydroxyproline, cysteine, homocysteine, penicillamine, aspartic acid, glutamic acid, homoglutamic acid, isoaspartic acid, isoglutamic acid, 2-aminoadipic acid, 2-aminosuberic acid, ornithine, lysine, 2,4-diaminobutanoic acid, 2,3-diaminopropionic acid, p-aminophenylalanine or glycine;

X¹⁴ represents a residue of lysine, arginine, ornithine, 2,4-diaminobutanoic acid, 2,3-diaminopropionic acid, p-aminophenylalanine, serine, threonine, homoserine, α -methylserine, 3-hydroxyproline, 4-hydroxyproline, cysteine, homocysteine, penicillamine, aspartic acid, glutamic acid, homoglutamic acid, isoaspartic acid, isoglutamic acid, 2-aminoadipic acid, 2-aminosuberic acid or glycine, and an amino group or guanidino group in the side chain of X¹⁴ may be modified with R³ (where R³ is independently selected from the moieties of [has the same significance as] R¹);

X¹⁵ represents lysine, arginine, ornithine, 2,4-diaminobutanoic acid, 2,3-diaminopropionic acid, p-aminophenylalanine or glycine;

X¹⁶ represents a residue of leucine, alanine, 4-thiazolylalanine, 2-thienylalanine, isoleucine, norleucine, homoleucine, valine, norvaline, β -alanine, α -aminoisobutanoic acid, 2-aminobutanoic acid, β -cyclopropylalanine, β -chloroalanine, 1-aminocyclopentane-1-carboxylic acid, 1-amino-1-cyclohexanecarboxylic acid, 2-amino-1-cyclopentanecarboxylic acid, t-butylglycine, diethylglycine, t-butylalanine, O-methylserine, cyclohexylglycine, cyclohexylalanine or glycine;

X¹⁷ represents a residue of 2-mercaptoaniline, cysteamine, homocysteamine, cysteine, homocysteine, penicillamine, ornithine, lysine, 2,3-diaminopropionic acid, 2,4-diaminobutanoic acid, p-aminophenylalanine, glutamic acid, aspartic acid, homoglutamic acid, isoaspartic acid, isoglutamic acid, 2-aminoadipic acid or 2-aminosuberic acid; and

R² represents substituted or unsubstituted alkoxy, substituted or unsubstituted aralkyloxy, amino, substituted or unsubstituted alkylamino, substituted or unsubstituted dialkylamino, substituted or unsubstituted aralkylamino, substituted or unsubstituted arylamino[,] or hydroxy; [and one to several]

where organic acid or amino acid residues [which are the same or different and arbitrarily] independently selected from [the group consisting of organic acid residues, amino acid residues and a 12-aminododecanoic acid residue mentioned in the above Xⁱ representations are] X¹ to X¹⁷ may be deleted, substituted or added [at arbitrary positions in the sequence}] , or 12-aminododecanoic acid residues may be substituted or added provided that at least seven Xⁱs where ni=1 remain.

2. (Amended) A peptide [having a cyclic structure] or a pharmaceutically acceptable salt thereof according to claim 1, wherein said cyclic structure is formed by a S-S, S-CH₂-S, S-CH₂-C₆H₄-CH₂-S, S-CH₂-CO, CO-NH, NH-CO, O-CO or CO-O bond between X^P and X^q.

3. (Amended) A peptide [having a cyclic structure] or a pharmaceutically acceptable salt thereof according to claim 2, wherein X^P (np=1) is an N-terminal residue and X^q (nq=1) is a C-terminal residue.

4. (Amended) A peptide [having a cyclic structure] or a pharmaceutically acceptable salt thereof according to claim 2, wherein X^P (np=1) is not an N-terminal residue and X^q (nq=1) is not a C-terminal residue.

5. (Amended) A peptide [having a cyclic structure] or a pharmaceutically acceptable salt thereof according to claim 2, wherein X^P (np=1) is not an N-terminal residue and X^q (nq=1) is a C-terminal residue.

6. (Amended) A peptide [having a cyclic structure] or a pharmaceutically acceptable salt thereof according to claim 2, wherein X^P (np=1) is an N-terminal residue and X^q (nq=1) is not a C-terminal residue.

7. (Amended) A peptide [having a cyclic structure] or a pharmaceutically acceptable salt thereof according to claim 3, wherein X^p ($np=1$) is X^1 and X^q ($nq=1$) is X^{17} .

8. (Amended) A peptide [having a cyclic structure] or a pharmaceutically acceptable salt thereof according to claim 6, wherein X^p ($np=1$) is X^1 and X^q ($nq=1$) is X^{17} .

9. (Amended) A peptide [having a cyclic structure] or a pharmaceutically acceptable salt thereof according to claim 3, wherein X^p ($np=1$) is X^1 and X^q ($nq=1$) is X^{16} .

10. (Amended) A peptide [having a cyclic structure] or a pharmaceutically acceptable salt thereof according to claim 6, wherein X^p ($np=1$) is an N-terminal residue and X^q ($nq=1$) is X^8 .

11. (Amended) A peptide [having a cyclic structure] or a pharmaceutically acceptable salt thereof according to claim 4, wherein X^p ($np=1$) is X^8 and X^q ($nq=1$) is X^{14} .

12. (Amended) A peptide [having a cyclic structure] or a pharmaceutically acceptable salt thereof according to claim 5, wherein X^p ($np=1$) is X^3 and X^q ($nq=1$) is a C-terminal residue.

13. (Amended) A peptide [having a cyclic structure] or a pharmaceutically acceptable salt thereof according to claim 4, wherein X^p ($n_p=1$) is X^3 and X^q ($n_q=1$) is not a C-terminal residue.

14. (Amended) A peptide [having a cyclic structure] or a pharmaceutically acceptable salt thereof according to claim 6, wherein X^p ($n_p=1$) is an N-terminal residue and X^q ($n_q=1$) is X^{11} .

15. (Amended) A peptide [having a cyclic structure] or a pharmaceutically acceptable salt thereof according to claim 1, said peptide having an amino acid sequence shown by one of SEQ ID NOS: 4-7 and 16-32 in which one to several organic acid or amino acid residues [which are the same or different and arbitrarily] independently selected from [the group consisting of organic acid residue, amino acid residues and a 12-aminododecanoic acid residue mentioned in the X^i representations in claim 1] X^1 to X^{17} may be deleted, substituted or added, or 12-aminododecanoic acid residues may be substituted or added.

16. (Amended) A peptide [having a cyclic structure] or a pharmaceutically acceptable salt thereof according to claim 15, said peptide having an amino acid sequence shown by one of SEQ ID NOS: 4-7, 16, 19 and 25-32 in which one to several organic acid or amino acid residues [which are the same or different and arbitrarily]

independently selected from [the group consisting of organic acid residues, amino acid residues and a 12-aminododecanoic acid residue mentioned in the Xⁱ representations in claim 1] X¹ to X¹⁷ may be deleted, substituted or added, or 12-aminododecanoic acid residues may be substituted or added.